

Translation

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference FP03-0013-00	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/JP03/01992	International filing date (day/month/year) 24 February 2003 (24.02.03)	Priority date (day/month/year) 08 March 2002 (08.03.02)
International Patent Classification (IPC) or national classification and IPC H01J 1/32, 43/22, 31/12, 31/50		
Applicant HAMAMATSU PHOTONICS K.K.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of \_\_\_\_\_ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 24 February 2003 (24.02.03)	Date of completion of this report 02 October 2003 (02.10.2003)
Name and mailing address of the IPEA/JP	Authorized officer
Facsimile No.	Telephone No.

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/JP03/01992

## I. Basis of the report

## 1. With regard to the elements of the international application:\*

- ☒ the international application as originally filed
- ☐ the description:  
 pages \_\_\_\_\_, as originally filed  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the claims:  
 pages \_\_\_\_\_, as originally filed  
 pages \_\_\_\_\_, as amended (together with any statement under Article 19  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the drawings:  
 pages \_\_\_\_\_, as originally filed  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the sequence listing part of the description:  
 pages \_\_\_\_\_, as originally filed  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_

## 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

## 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/fig \_\_\_\_\_

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/JP 03/01992

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims	1-13	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-13	NO
Industrial applicability (IA)	Claims	1-13	YES
	Claims		NO

## 2. Citations and explanations

Document 1: JP 10-144251 A (Hamamatsu Photonics Kabushiki Kaisha), 29 May 1998, entire text, all drawings

Document 2: JP 2001-6531 A (Nikon Corp.), 12 January 2001, paragraphs [0018] to [0021]

Document 3: JP 11-233000 A (Hamamatsu Photonics Kabushiki Kaisha), 27 August 1999, entire text, all drawings

Document 4: JP 10-223131 A (Hamamatsu Photonics Kabushiki Kaisha), 21 August 1998, paragraphs [0011] to [0013], [0021] and [0030]

Document 5: JP 10-223162 A (Hamamatsu Photonics Kabushiki Kaisha), 21 August 1998, entire text, all drawings, (Family: none)

Claims 1-3 and 9-11

Claims 1-3 and 9-11 do not involve an inventive step in the light of documents 1-3.

Document 1 discloses a secondary electron discharge surface having a secondary electron discharge layer that comprises polycrystalline diamond as a primary constituent. When discharging electrons from the diamond layer, it would be obvious to a person skilled in the art

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.  
PCT/JP 03/01992

of this technical field to form an electric field within the layer, as in the invention disclosed in document 2, and to employ a voltage application means for applying a predetermined voltage between the incident surface and the outgoing surface, such as that disclosed in document 3, as the means for achieving this feature.

## Claims 4-8

Claims 4-8 do not involve an inventive step in the light of documents 1-4.

The features of terminating with hydrogen or oxygen and of providing an active layer comprising an alkali metal in order to facilitate the discharge of electrons from the outgoing surface of the diamond layer are well known and commonly used as disclosed in, for example, document 4.

With regards to claim 4, document 4 indicates that unbonded carbon that lacks a bonding partner is included within the surfaces at the crystal particle boundaries of the polycrystalline diamonds. A person skilled in the art of this technical field could also terminate the unbonded carbon in the particle boundaries with oxygen as necessary in order to achieve the common objective of discharging electrons from within the layer.

## Claims 12 and 13

Claims 12 and 13 do not involve an inventive step in the light of document 5 and documents 2 and 3.

Document 5 discloses an electron tube having a field-emission electron source, a transmission-type secondary electron surface equipped with a secondary electron discharge layer that comprises diamond as a primary constituent, and a fluorescent surface.

When discharging electrons from the diamond layer, it would be obvious to a person skilled in the art of this

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/JP 03/01992

technical field to form an electric field within the layer, as in the invention disclosed in document 2, and to employ a voltage application means for applying a predetermined voltage between the incident surface and the outgoing surface, such as that disclosed in document 3, as the means for achieving this feature.